

ATTORNEY DOCKET NO.
004578.0778

PATENT APPLICATION
08/675,280

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: WEBER, et al.
Serial No.: 08/675,280
Filed: July 1, 1996
Group No.: 3743
Examiner: Christopher Atkinson
Title: CONSTRUCTION OF PHASE CHANGE
MATERIAL EMBEDDED ELECTRONIC
CIRCUIT BOARDS AND ELECTRONIC
CIRCUIT BOARD ASSEMBLIES USING
POROUS AND FIBROUS MEDIA
Attorney Reference: 004578.0778

Assistant Commissioner
for Patents
Washington, D.C. 20231

Sir:

TRANSMITTAL FOR REPLY BRIEF

This transmittal letter and its enclosures are being hand-carried to the examining group to which the present application is assigned. Enclosed with this transmittal letter is a Reply Brief in triplicate under 37 C.F.R. §1.193(b)(1). It is believed that no further fees are due at this time, but the Commissioner is hereby authorized to charge

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any additional fee required by this paper, or to credit any overpayment, to Deposit Account No. 02-0384 of Baker Botts L.L.P.

Respectfully submitted,
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Date: November 21, 2002

Enclosures: Reply Brief with enclosure (in triplicate)
Acknowledgment Post Card

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Assistant Commissioner
for Patents
BOARD OF PATENT APPEALS
AND INTERFERENCES
Washington, D.C. 20231

Sir:

REPLY BRIEF

Pursuant to the provisions of 37 C.F.R.
§1.193(b)(1), this Reply Brief is being filed in response to
the Examiner's Answer (Paper No. 49) mailed on October 2,
2002. This Reply Brief is accompanied by a separate
transmittal letter, which serves to submit this Reply Brief in
triplicate.

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ARGUMENT

This Reply Brief addresses several points, which are discussed separately below.

Pending Petition

Follow receipt of the Examiner's Answer, Applicants filed a Petition, which is still pending. The Petition indicates that a new ground of rejection is raised by a sentence which appears in the Examiner's Answer at lines 7-8 on page 7. Although Applicants have not yet received a decision on the Petition, Applicants are proceeding with preparation and filing of this Reply Brief in order to meet the due date for submission of this Reply Brief. If the Petition ultimately results in a decision that the Examiner is in fact raising a new ground of rejection, then the Examiner will be required to reopen prosecution, and this Reply Brief will then be ignored. Accordingly, since this Reply Brief will only be considered on the merits if the PTO's ultimate decision on the Petition is that the Examiner has not raised a new ground of rejection, the following discussion reflects an assumption that the ultimate decision on the Petition is that the Examiner did not raise a new ground of rejection.

Typographical Error

In the Examiner's Answer, line 19 on page 4 includes a typographical error, in that it includes a reference to Claims 21 and 22. Elsewhere in the Examiner's Answer (lines 6-7 on page 2), the Examiner indicates that the statement of issues in the original Appeal Brief is correct. That statement of issues in the Appeal Brief expressly reflected the fact that the rejection of Claims 21 and 22 is based on a

ground of rejection different from the ground which is discussed at line 19 on page 4 of the Examiner's Answer. Consequently, the reference to Claims 21 and 22 in line 19 on page 4 of the Examiner's Answer is clearly a typographical error.

Reply to Arguments Presented in Examiner's Answer

In the Examiner's Answer, most of the text relating to the merits has been copied substantially verbatim from the final rejection mailed on June 3, 2002. In particular, the discussion which runs from line 4 on page 3 to line 19 on page 6 of the Examiner's Answer is equivalent to text which appears in the final rejection from line 9 on page 3 to line 7 on page 6, at lines 6-20 on page 7, and at lines 7-10 on page 8. Further, the discussion which appears in the Examiner's Answer from line 12 on page 7 to line 12 on page 8 is equivalent to text which appears in the final rejection at lines 1-3 on page 5, and from line 8 on page 6 to line 5 on page 7. Consequently, these portions of the Examiner's Answer are not a reply to the arguments advanced in Applicants' Appeal Brief. Instead, these portions of the Examiner's Answer merely reiterate what was previously said in the final rejection. Since Applicants' Appeal Brief has already presented relevant arguments against the final rejection, this Reply Brief does not address these portions of the Examiner's Answer, because discussing these portions here would be repetitious of and redundant to the arguments in the Appeal Brief.

There is only one portion of the Examiner's Answer in which the Examiner presents a new argument, and this is the portion which runs from line 19 on page 6 to line 11 on page 7. This portion of the Examiner's Answer is a reply to Applicants' arguments against the rejection of Claims 25-27

and 30-31 under 35 U.S.C. §102 on the ground that they are anticipated by Telkes U.S. Patent No. 2,677,367. In reply to the new arguments presented by the Examiner in this portion of the Examiner's Answer, Applicants offer the following comments.

In this portion of the Examiner's Answer, the Examiner discusses Claims 25-27 and 30-31 in a manner suggesting that each recites a "matrix" and a "container". (One example is the sentence at lines 4-6 on page 7). However, Claims 25-27 and 30-31 do not actually include the terminology used by the Examiner. For example, these claims recite a "porous material" rather than a "matrix", and recite an "enclosure" rather than a "container". Applicants believe that the claims should be evaluated on the basis of the terminology which Applicants have selected for use in the claims, rather than on the basis of terminology which is not in the claims but has been selected by the Examiner in an attempt to paraphrase the claims.

Turning in more detail to the §102 rejection of Claims 25-27 and 30-31, independent Claims 25 and 30 each recite that a porous material in a cavity of an enclosure is "coupled physically" to a portion of the enclosure. In support of an assertion that Claims 25 and 30 are anticipated by Telkes, the Examiner's Answer presents a chain of reasoning. One link in this chain is a statement (at lines 7-8 on page 7 of the Examiner's Answer) that the present application provides "no written disclosure that teaches one how to physically couple the matrix to a container". In effect, this is an assertion that the present application fails to comply with the "enabling" and "written disclosure" requirements of the first paragraph of 35 U.S.C. §112, and that the disclosure thus fails to provide support for the

recitation in Claims 25 and 30 that the porous material and enclosure are "coupled physically". There are several problems with this assertion.

First, the final rejection did not include any rejection of Claims 25 and 30 based on §112. Therefore, and as noted above, Applicants filed a Petition pointing out that this sentence of the Examiner's Answer has the effect of improperly raising a new ground of rejection under the first paragraph of §112. At the time this Reply Brief was prepared, the PTO had not yet rendered a decision on the Petition. If the Petition results in a decision that the indicated sentence raises a new ground of rejection under §112, the Examiner will be required to reopen prosecution, and this Reply Brief will not reach the Board. On the other hand, if this Reply Brief has reached the Board, it is because the Petition resulted in a decision that the present application does in fact comply with §112 in regard to the point addressed in the indicated sentence, or in other words that the present application does include a written disclosure which teaches how to physically couple the porous material and the enclosure. This will mean that the PTO itself has decided that the sentence at lines 7-8 on page 7 in the Examiner's Answer is wrong, which in turn will mean that the PTO has effectively decided that the premise underlying the Examiner's chain of reasoning about anticipation is wrong. To the extent that the Examiner's premise is wrong, the conclusions about anticipation which are based on that premise become merely unsupported assertions. The Examiner's chain of reasoning under §102 is grounded on a factor which can only be considered under §112, and not under §102. Consequently, to the extent that the Examiner has presented a chain of reasoning under §102 which depends on a factor that cannot be considered under §102, the position

taken by the Examiner under §102 is not proper, and should not be maintained.

A second consideration is that the Examiner's assertion regarding lack of an enabling written disclosure is factually wrong. More specifically, and as discussed in the Appeal Brief, Applicants have elected the embodiment of Figure 2 for examination in the present application (pursuant to an election of species requirement). As explained in detail in the Appeal Brief (pages 5-6), Figure 2 shows an enclosure at 11 and 17, and also shows a porous material 13 in the form of fibers that have end portions physically embedded in the portion 11 of the enclosure. It is respectfully submitted that Applicants' disclosure of embedding end portions of the fibers 13 in the portion 11 constitutes a very clear teaching of one suitable way to physically couple a porous material to an enclosure. There is no reasonable basis for the Examiner's assertion to the contrary in the Examiner's Answer. (Applicants wish to add that the discussion here of the embodiment of Figure 2 is offered by way of example, and is not intended to suggest any limitation to the scope of the claims).

A third problem with the indicated sentence of the Examiner's Answer is that the Examiner interprets certain language in Applicants' claims in a manner which is contrary to the accepted meaning of that language. In more detail, the Examiner notes that the Telkes patent discloses a glass wool matrix 14' which merely touches the wall of a container 10, and the Examiner asserts that "the Examiner believes touching meets the limitation of physical coupling" (lines 8-9 on page 7 of the Examiner's Answer). However, and contrary to the position of the Examiner, parts which merely touch each other are not normally considered to be physically coupled to each

other. In this regard, Applicants are enclosing an excerpt from The American Heritage College Dictionary, which includes a definition of the word "coupled". This dictionary definition indicates that the preferred definition of "coupled" is "To link together; connect". Obviously, two parts which merely touch each other would not normally be considered to be linked together or connected together, and thus would not satisfy the normal definition of being physically "coupled". Therefore, the glass wool matrix 14' and the container 10 of Telkes cannot reasonably be said to be "coupled physically" to each other. Accordingly, and as discussed in detail on pages 20-23 of Applicants' Appeal Brief, Telkes fails to teach one of the limitations which is expressly recited in each of Claims 25 and 30. As a result, Telkes fails to meet the requirements for anticipation of Claims 25 and 30 under §102. Independent Claims 25 and 30, as well as dependent Claims 26-27 and 31, are therefore believed to be patentably distinct from Telkes.

Conclusion

For the reasons given in Applicants' Appeal Brief, supplemented by the foregoing discussion, it is respectfully submitted that the rejection of each of Claims 1-2, 7-8, 17-22, 25-28 and 30-31 is erroneous, and reversal of the rejection of each of these claims is respectfully requested.

Respectfully submitted,
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Date: November 21, 2002

Enclosure: Excerpt from The American Heritage
College Dictionary (title page,
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coun·tri·fied also coun·try·fied (kūn'tri-fid') *adj.* 1. Resembling or having the characteristics of country life; rural. 2. Lacking sophistication.

coun·try (kūn'trē) *n., pl. -tries* 1.a. A nation or state. b. The territory of a nation or state; land. c. The people of a nation or state; populace. 2. The land of a person's birth or citizenship. 3. A region, territory, or large tract of land distinguishable by features of topography, biology, or culture. 4. A district outside of cities and towns; a rural area. 5. *Informal*. Country music. — *adj.* 1. Of, relating to, or typical of the country. 2. Of or relating to country music. [ME *countre* < OFr. *contree* < VLat. **(terra) contrāta*, (land) opposite, before < Lat. *contrā*, opposite. See *kom**.]

country and western *n.* See *country music*.

country club *n.* A suburban club for social and sports activities, usu. featuring a golf course.

country cousin *n.* One whose ingenuousness or rustic ways may bemuse or entertain city dwellers.

coun·try·dance (kūn'trē-dāns') *n.* A folk dance of English origin in which two lines of dancers face each other.

country gentleman *n.* A man who owns a country estate.

coun·try·man (kūn'trē-mān) *n.* 1. A person from one's own country; a compatriot. 2. A native or an inhabitant of a particular country. 3. A man who lives in the country.

country mile *n.* *Informal*. A very great distance.

country music *n.* *Mus.* Popular music based on the folk style of the southern rural United States or on the music of cowboys in the American West.

coun·try·seat (kūn'trē-sēt') *n.* An estate or mansion in the country.

coun·try·side (kūn'trē-sid') *n.* 1. A rural region. 2. The inhabitants of a rural region.

coun·try·wide (kūn'trē-wid') *adv. & adj.* Throughout a whole country; nationwide: *a countryside search*.

coun·try·wom·an (kūn'trē-wōm-'ān) *n.* 1. A woman from one's own country; a compatriot. 2. A woman from a particular country. 3. A woman who lives in the country.

coun·ty (koun'tē) *n., pl. -ties* 1. An administrative subdivision of a state in the United States. 2.a. A territorial division exercising administrative, judicial, and political functions in Great Britain and Ireland. b. The territory under the jurisdiction of a count or earl. 3. The people living in a county. [ME *countie*, territorial division < OFr. *conte*, the territory of a count < Med.Lat. *comitatus* < LLat., the office of count < Lat., retinue < *comes*, *comit*, companion. See *el**.] — *coun'ty adj.*

county agent *n.* A government employee who serves as a consultant and adviser in a chiefly rural county on such matters as agriculture, education, and home economics.

county fair *n.* A fair usu. held every year in a county.

county palatine *n., pl. counties palatine*. The domain of a count palatine in England or Ireland.

county seat *n.* A town or city that is the administrative center of its county.

county town *n.* *Chiefly British*. A county seat.

coun·ty·wide (koun'tē-wid') *adv. & adj.* Throughout a whole county: *found at locations countywide*.

coup (kōō) *n., pl. coups* (kōōz). 1. A brilliantly executed stratagem; a masterstroke. 2. A coup d'état. [Fr., stroke < OFr. *colp* < LLat. *colpus*. See *cor**.]

coup de grâce (kōō' də grās') *n., pl. coups de grâce*. 1. A deathblow delivered to end the misery of a mortally wounded victim. 2. A finishing stroke or decisive event. [Fr.: *coup*, stroke + *de*, of + *grâce*, mercy.]

coup de main (də mān') *n., pl. coups de main*. A sudden action undertaken to surprise an enemy. [Fr.: *coup*, stroke, blow + *de*, of + *main*, hand.]

coup d'état (də-tā') *n., pl. coups d'état or coup d'états* (də-tā'). The sudden overthrow of a government by a usu. small group of persons in or previously in positions of authority. [Fr.: *coup*, blow, stroke + *de*, of + *état*, state.]

coup de thé·âtre (də-tā-'ā-trē) *n., pl. coups de théâtre*. 1. A sudden, dramatic turn of events in a play. 2. An unexpected and sensational event, esp. one that reverses or negates a situation. [Fr.: *coup*, stroke + *de*, of + *théâtre*, theater.]

coup d'oeil (də-ō'ē) *n., pl. coups d'oeil*. A quick survey; a glance. [Fr.: *coup*, stroke + *de*, of + *oeil*, eye.]

coupe¹ (kōōp) *n.* 1.a. A dessert of ice cream or fruit-flavored ice, garnished and served in a special dessert glass. b. The stemmed glass in which a coupe is served. 2. A shallow bowl-shaped dessert dish. [Fr., cup < LLat. *cuppa*.]

coupe² (kōōp) *n.* Var. of *coupé*.

cou·pé (kōō-pā') *n.* 1. A closed four-wheel carriage with two seats inside and one outside. 2. Also *coupe* (kōōp). A closed two-door automobile. [Fr. < p.part. of *couper*, to cut < *coup*, blow. See *cou**.]

Cou·pe·rin (kōō-pē-rān', kōōp-rān'), François. 1668–1733. French composer who was court organist to Louis XIV.

cou·ple (kūp'l) *n.* 1. Two items of the same kind; a pair. 2. Something that joins or connects two things together; a link. 3. (*used with a sing. or pl. v.*) a. Two people united, as by marriage. b. Two people together. 4. *Informal*. A few;



Gustave Courbet



COURSE
Slalom ski course

several: *a couple of days*. 5. *Phys.* A pair of forces of equal magnitude acting in parallel but opposite directions. — *v.* *pled, -pling, -ples*. — *tr.* 1. To link together; connect. 2.a. To join as spouses; marry. b. To join in sexual union. 3. *Elect.* To link (two circuits or currents) as by magnetic induction. — *intr.* 1. To form pairs; join. 2. To unite sexually; copulate. 3. To join chemically. — *adj.* *Informal*. Two or few. [ME < OFr. < Lat. *cōpula*, bond, pair.]

Usage Note: When used to refer to two people who function socially as a unit, as in a *married couple*, the word *couple* may take either a singular or a plural verb, depending on whether the members are considered individually or collectively: *The couple were married last week. Only one couple was unaccounted for.* When a pronoun follows, *they* and *their* are more common than *it* and *its*: *The couple decided to spend their (less commonly its) vacation in Italy.* • Critics have sometimes maintained that a *couple of* is too inexact to be appropriate in formal writing. But the inexactitude of a *couple of* may usefully suggest that the writer is indifferent to the precise number of items involved. The usage should be considered unobjectionable on all levels of style.

cou·pler (kūp'lār) *n.* 1. One that couples, esp. a device for coupling two railroad cars. 2. *Mus.* A device connecting two organ keyboards so that they may be played together.

cou·plet (kūp'līt) *n.* 1. A unit of verse consisting of two successive lines, usu. rhyming and having the same meter. 2. Two similar things; a pair. [Fr. < OFr., dim. of *couple*, couple. See *couple*.]

cou·pling (kūp'ling) *n.* 1. The act of forming couples. 2. The act of uniting sexually. 3. A device that links or connects. 4. *Electron.* Transfer of energy from one circuit to another. 5. The body part of a four-footed animal that connects the hindquarters to the forequarters.

cou·pon (kōō'pōn', kyōō'-) *n.* 1. A negotiable certificate attached to a bond that represents a sum of interest due. 2.a. One of a set of detachable certificates that may be torn off and redeemed as needed. b. A detachable part, as of an advertisement, that entitles the bearer to certain benefits, such as a refund. c. A certificate accompanying a product that may be redeemed for a cash discount. d. A printed form to be used as an order blank or for requesting information or obtaining a discount. 3. A detachable slip calling for periodic payments, as for merchandise bought on an installment plan. [Fr. < OFr. *colpon*, piece cut off < *colper*, to cut < *colp*, blow. See *cou**.]

cour·age (kūr'ij, kūr'-) *n.* The state or quality of mind or spirit that enables one to face danger, fear, or vicissitudes with self-possession and resolution; bravery. [ME *corage* < OFr. < VLat. **corditium* < Lat. *cor*, heart. See *kerd**.]

cou·ra·geous (kō-rā'jēəs) *adj.* Having or characterized by courage; valiant. See *Syns at brave*. — *cou·ra·geous·ly adv.* — *cou·ra·geous·ness n.*

cou·rante (kōō-rānt') *n.* 1. A 17th-century French dance characterized by running and gliding steps to an accompaniment in triple time. 2. *Mus.* The second movement of the classical baroque suite. [Fr. < fem. p.part. of *courir*, to run < OFr. *courre* < Lat. *currere*. See *kers**.]

Cour·an·tyne also Cour·an·tijn (kōr-'ən-tin', kōr'-). A river rising in SE Guyana and flowing c. 724 km (450 mi) to the Atlantic Ocean.

Cour·bet (kōōr-bā', -bē'), Gustave. 1819–77. French painter known for his realistic depiction of everyday scenes.

cour·gette (kōōr-zhēt') *n.* *Chiefly British*. A zucchini. [Fr. dial., dim. of *courge*, gourd < OFr. *cobourde* < Lat. *cucurbita*.]

cou·ri·er (kōōr'ē-ər, kūr'-, kūr'-) *n.* 1.a. A messenger, esp. one on official diplomatic business. b. A spy carrying secret information. 2.a. A personal attendant hired to make arrangements for a journey. b. An employee of a travel agency serving as a guide for tourists. [Fr. *courrier* < OFr. < ÖItal. *corriere* < *correre*, to run < Lat. *currere*. See *kers**.]

cour·lan (kōōr'lān) *n.* See *Ilmpkin*. [Fr., perh. alteration of *courliri* < Galibi *kurliri*.]

Cour·land also Kur·land (kōōr'lānd). A historical region of S Latvia between the Baltic Sea and the Western Dvina R.

course (kōrs, kōrs) *n.* 1. Onward movement in a particular direction; progress. 2. The direction of continuing movement. 3. The route or path taken by something, such as a stream, that moves. See *Syns at way*. 4. Movement in time; duration. 5. *Sports*. A designated area of land or water on which a race is held or a sport played. 6. A mode of action or behavior. 7. A typical or natural manner of proceeding or developing; customary passage. 8. A systematic or orderly succession; a sequence. 9. A continuous layer of building material, such as brick on a wall or roof of a building. 10.a. A complete body of prescribed studies constituting a curriculum. b. A unit of such a curriculum. 11. A part of a meal served as a unit at one time. 12. *Naut.* The lowest sail on a mast of a square-rigged ship. 13. A point on the compass, esp. the one toward which a ship is sailing. — *v.* *coursed, cours·ing, cours·es*. — *tr.* 1. To move swiftly through or over; traverse. 2.a. To hunt (game) with hounds. b. To set (hounds) to chase game. — *intr.* 1. To proceed or move swiftly along a specified course.

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Sir:

APPEAL BRIEF

A timely Notice of Appeal is being filed concurrently herewith, in order to initiate an appeal from the action of the Primary Examiner in finally rejecting Claims 1-2, 7-8, 17-22, 25-28 and 30-31 in the Office Action mailed June 3, 2002. This Appeal Brief is being filed pursuant to the provisions of 37 C.F.R. §1.192. A separate transmittal letter serves to transmit this Appeal Brief in triplicate, and serves to transmit a check in the amount of \$320.00 (Fee Code 120) under 37 C.F.R. §§1.192(a) and 1.17(c) to cover the large entity fee for filing this Appeal Brief. The transmittal letter and its enclosures are being hand-carried to the examining group to which the present application is assigned.

07/11/2002 TTU:TT2 00000004 08675280
01 FC:120 320.00 OP

REAL PARTY IN INTEREST

The present application is a Rule 62 division of a parent application (U.S. Serial No. 08/406,226 filed March 17, 1995, now abandoned). Within the context of the present application, a continuing prosecution application (CPA) was recently filed on May 16, 2002 (but of course did not change the serial number of the present application). The assignee of record of the present application is Raytheon Company, by virtue of:

1. an Assignment recorded in the assignment records of the U.S. Patent and Trademark Office on March 17, 1995 at Reel 7411, Frames 0772-0773, which transferred the parent application (and any continuing applications) from the inventors to Texas Instruments Incorporated; and
2. an Assignment recorded in the assignment records of the U.S. Patent and Trademark Office on March 3, 1999 at Reel 9764, Frames 0360-0386, which transferred the present application from Texas Instruments Incorporated to Raytheon Company.

RELATED APPEALS AND INTERFERENCES

A separate appeal was previously filed and decided in the present application (Appeal No. 98-1605, filed September 30, 1997). More specifically, on June 23, 1999 the Board rendered a Decision in that prior appeal which overturned the final rejection, and which remanded the application to the Examiner for consideration of issues

identified by the Board. Since then, the claims have been amended. Moreover, the current final rejection is based on art different from that involved in the prior appeal. Consequently, Applicants do not believe that the prior appeal, which has now been concluded for three years, will directly affect or have a bearing on the Board's decision in the present appeal. Nevertheless, the prior appeal is identified here for purposes of completeness.

With this in mind, Applicants believe that there are no known appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

STATUS OF CLAIMS

Claims 1-2, 7-8, 17-22, 25-28 and 30-31 stand finally rejected, pursuant to an Office Action mailed June 3, 2002. Claims 3-6, 9-16 and 23-24 have been canceled. Dependent Claim 29 remains in the application but, pursuant to an election of species requirement, has been withdrawn from examination because it does not read onto the currently elected species (Figure 2). The claims appealed are Claims 1-2, 7-8, 17-22, 25-28 and 30-31, which are all of the pending claims other than withdrawn Claim 29. Although Claim 29 is not on appeal here, it should be noted that Claim 29 depends from independent Claim 25 and that, if independent Claim 25 is ultimately determined to be allowable, Claim 29 will automatically be removed from withdrawn status, and will be allowed with independent Claim 25.

STATUS OF AMENDMENTS

An Amendment is being filed concurrently with this Appeal Brief, in order to cancel from the specification a

paragraph previously added by amendment. The final rejection mailed on June 3, 2002 includes a requirement by the Examiner for cancellation of this paragraph, and it is thus expected that the Amendment will be entered. (Cancellation of this paragraph from the specification does not reflect agreement by Applicants that the Examiner's stated rationale for the requirement is correct, for reasons noted in the Amendment). No other amendments have been made since issuance of the pending final rejection mailed June 3, 2002.

SUMMARY OF INVENTION

Pursuant to an election of species requirement, the species of Figure 2 has been elected for examination in the present application. (In contrast, the species of Figure 1 was elected for examination in the parent application, which was U.S. Serial No. 08/406,226 filed March 17, 1995, now abandoned). Some of the claims on appeal read onto disclosed embodiments other than just Figure 2. Moreover, at least one of the rejections on appeal has been formulated so that the embodiment of Figure 1 is relevant to the rejection. Therefore, the following discussion addresses not only the elected embodiment of Figure 2, but also briefly addresses the non-elected embodiments of Figures 1 and 3. The following discussion also mentions some features which are not recited in some of the claims, and it should be understood that the following discussion is intended to convey an understanding of several forms of the invention as implemented in three specific embodiments, and is not intended to be interpreted as adding any limitation to the scope of any claim on appeal.

The embodiment of Figure 1 is described in lines 2-15 on page 7 of the specification. Figure 1 depicts a heat sink which includes an enclosure defined by an aluminum plate

(3) and a cover or lid (5). An inherent characteristic of the aluminum plate (3) is that it is highly thermally conductive. A cavity is defined between the plate (3) and the lid (5), and a porous aluminum medium (1) such as an aluminum foam is provided within the cavity. The aluminum medium (1) is physically and thermally coupled to the plate (3), for example by vacuum brazing. Since the aluminum medium (1) is porous, it does not entirely fill the cavity. The remaining space in the cavity is either partly or fully filled (at 7) with a phase change material (PCM), which in the disclosed embodiment is paraffin (i.e. a wax). The PCM (7) can change between liquid and solid phases as it absorbs and gives up heat. When the PCM (7) fully fills the portion of the cavity that is not already taken up by the porous aluminum medium (1), the PCM (7) is inherently incapable of any substantial movement within the cavity, either in its liquid phase or its solid phase.

As noted above, the porous medium (1) is physically and thermally coupled to the aluminum plate (3). When external heat is supplied to the aluminum plate (3), for example from electronic components mounted on the outer surface of the plate (3), the heat is transferred through the plate (3) and then through the porous aluminum medium (1) to the PCM (7). The porous aluminum medium (1) facilitates efficient and uniform distribution of the heat within the PCM (7). As the PCM (7) heats up, it changes from a solid state to a liquid state. Subsequently, when the external heat source stops supplying heat to the plate (3), the energy stored in the PCM (7) can be discharged through the porous aluminum medium (1) and the plate (3), in the form of heat.

Turning to Figure 2, this embodiment is described from line 16 on page 7 of the specification to line 4 on page 3. Figure 2 depicts a heat sink having an enclosure defined

by a highly thermally conductive plate (11) and a lid (17). A cavity is defined between the plate (11) and the lid (17). The plate (11) includes a composite fiber material with a plurality of highly thermally conductive graphite fibers disposed in a matrix (which in the disclosed embodiment includes an epoxy). Many of the graphite fibers each have one end portion which is embedded in the plate (11), and a further end portion (13) which is disposed in the cavity. The end portions (13) of the fibers which are within the cavity thus define a thermally conductive porous medium within the cavity. The portion of the cavity not taken up by these fiber ends (13) contains a PCM (15), which in the disclosed embodiment is paraffin.

In the sentence bridging pages 7-8, the specification explains that the PCM (15) in the embodiment of Figure 2 is entered into the cavity of Figure 2 in the same manner that the PCM (7) in the embodiment of Figure 1 is entered into the cavity of Figure 1. As to Figure 1, the specification explains in the sentence at lines 7-10 on page 7 that the PCM (7) is entered into the cavity of Figure 1 so that it will "partially or fully fill the remainder of the cavity" (where "remainder" refers to the portion of the cavity that is not taken up by the porous aluminum medium). Thus, since the sentence bridging pages 7-8 of the specification states that the PCM (15) in the embodiment of Figure 2 is entered into the cavity of Figure 2 in a similar manner, the PCM (15) partially or fully fills the remainder of the cavity of Figure 2, or in other words the portion of the cavity that is not taken up by the porous material (13). When the PCM (15) fully fills the portion of the cavity that is not already taken up by the porous medium (13), the PCM (15) is inherently incapable of any substantial movement within the cavity,

either in its liquid phase or its solid phase. The embodiment of Figure 2 operates in a manner similar to the embodiment of Figure 1, and its operation is therefore not separately described here in detail.

The embodiment of Figure 3 is described at lines 9-20 on page 8 of the specification. Figure 3 depicts a heat sink which includes an enclosure defined by an aluminum plate (21), a lid (29), and a wall member (23) extending between the plate (21) and the lid (29). In the disclosed embodiment, the wall member (23) is made of a plastic. The plate (21), lid (29) and wall member (23) collectively define a cavity, and a thermally conductive porous medium (25) is provided within the cavity. The portion of the cavity which is not taken up by the porous medium (25) contains a PCM (27). The embodiment of Figure 3 operates in a manner similar to the embodiments of Figures 1 and 2, and its operation is therefore not separately described here in detail.

ISSUES

As discussed above, an Amendment has been filed concurrently with this Appeal Brief in order to cancel from the specification a paragraph previously added by amendment, for the purpose of eliminating an objection to the specification which was part of the final rejection mailed June 3, 2002. The present appeal involves four remaining grounds of rejection from that final rejection. More specifically, the issues presented for consideration in the present appeal are as follows:

ISSUE 1 - CLAIMS 26 AND 31 - §112 FIRST PARAGRAPH REJECTION

Do Claims 26 and 31 recite subject matter which was not disclosed in the application as originally filed, and do Claims 26 and 31 thus fail to satisfy a requirement of the first paragraph of 35 U.S.C. §112? (It will be noted that the final rejection also includes a separate objection to the specification under 37 C.F.R. §1.71, on the ground that the originally-filed specification does not disclose the subject matter of Claims 26 and 31. This objection to the specification is redundant to the §112 rejection, in that it is merely a restatement of precisely the same issue which underlies the §112 rejection. The objection to the specification is not officially on appeal here, but since it is identical to the §112 issue which is properly on appeal here, it will automatically be resolved by the Board's decision on the §112 issue).

ISSUE 2 - CLAIMS 25-27 AND 30-31 - §102 REJECTION

Are Claims 25-27 and 30-31 anticipated under 35 U.S.C. §102 by Telkes U.S. Patent No. 2,677,367?

ISSUE 3 - CLAIMS 1-2, 7-8, 17-20 AND 28 - §103 REJECTION

Are Claims 1-2, 7-8, 17-20 and 28 obvious under 35 U.S.C. §103 based on a proposed combination of teachings from Telkes U.S. Patent No. 2,677,367 and Voorhes U.S. Patent No. 5,390,734? (In setting forth this ground of rejection in lines 25-26 on page 4, the final rejection also mentions Claims 21-22. However, the reference there to Claims 21-22 is a typographical error, because it is directly inconsistent with the explanation in the final rejection of a separate ground of rejection for Claims 21-22 (addressed immediately

below), as explained in more detail later in this Brief. Consequently, to avoid confusion, Claims 21-22 are omitted here).

ISSUE 4 - CLAIMS 21-22 - §103 REJECTION

Are Claims 21-22 obvious under 35 U.S.C. §103 based on a proposed combination of teachings from Telkes U.S. Patent No. 2,677,367, Voorhes U.S. Patent No. 5,390,734, and one of Hayes U.S. Patent No. 4,446,916 and Alspaugh U.S. Patent No. 4,341,262?

GROUPING OF CLAIMS

With respect to the four issues identified in the immediately preceding section of this Brief, the grouping of the claims involved in each of these issues is respectively as follows.

GROUP 1 - CLAIMS 26 AND 31 - §112 FIRST PARAGRAPH REJECTION

With respect to this ground of rejection, Claims 26 and 31 stand or fall together for purposes of this appeal.

GROUP 2 - CLAIMS 25-27 AND 30-31 - §102 REJECTION

With respect to this ground of rejection, Claims 25-27 and 30-31 stand or fall together for purposes of this appeal.

GROUP 3 - CLAIMS 1-2, 7-8, 17-20 AND 28 - §103 REJECTION

As noted above, and as explained later, the inclusion of Claims 21-22 in this ground of rejection by the final rejection is a typographical error. As to the remaining claims that are subject to this ground of rejection, Claims 1-

2, 7-8, 17-20 and 28 stand or fall together for purposes of this appeal.

GROUP 4 - CLAIMS 21-22 - §103 REJECTION

With respect to this ground of rejection, Claims 21-22 stand or fall together for purposes of this appeal.

ARGUMENT

A. GROUP 1 - CLAIMS 26 AND 31 - §112 FIRST PARAGRAPH REJECTION

Dependent Claims 26 and 31 stand rejected under the first paragraph of 35 U.S.C. §112, based on the assertion that they each recite subject matter which is not disclosed in the originally-filed text and drawings of the present application. Applicants respectfully traverse the §112 rejection, for reasons set forth below.

Before discussing the §112 rejection, Applicants first wish to point out that, as mentioned briefly above, the final rejection also includes a separate objection to the specification under 37 CFR § 1.71, based on the assertion that the specification does not disclose the subject matter recited in Claims 26 and 31. This objection is thus merely a redundant restatement of precisely the same issue that underlies the §112 rejection. Therefore, although this objection to the specification is not officially on appeal here, as a practical matter the issue underlying this objection is on appeal here in the form of the §112 rejection. Consequently, the Board's resolution of the §112 rejection will also automatically resolve this objection to the specification. The discussion which follows is directed to the §112 rejection, in order to avoid complexity and

confusion, and because this is technically the form in which the particular issue happens to be on appeal here.

Turning in more detail to the §112 rejection of dependent Claims 26 and 31, Claim 26 depends from independent Claim 25, and thus inherently includes all of the limitations of Claim 25. Similarly, Claim 31 depends from independent Claim 30, and thus inherently includes all of the limitations of Claim 30. Independent Claims 25 and 30 are not subject to a rejection under §112, which means that the subject matter of independent Claims 25 and 30 was properly disclosed by the originally-filed application papers. In this regard, Claim 25 is an apparatus claim which recites a heat sink that includes an enclosure having a highly thermally conductive portion and having a cavity, the cavity containing a highly thermally conductive porous material and containing a phase change material in voids of the porous material, the porous material being coupled physically and thermally to the highly thermally conductive portion of the enclosure. Independent Claim 30 is a method claim rather than a apparatus claim, but includes limitations analogous to those just discussed in association with claim 25.

Turning to dependent Claims 26 and 31, Claim 26 recites that "said phase change material is free of substantial movement within said cavity". Claim 31 includes an analogous method limitation of "causing said phase change material to be substantially free of movement within said cavity". These are the limitations subject to rejection under the first paragraph of §112, based on the assertion that this subject matter was not disclosed anywhere in the originally-filed application papers.

Before explaining in detail how this subject matter finds support in the originally-filed application papers,

Applicants first wish to point out that the rejection of Claims 26 and 31 under §112 is directly inconsistent with the treatment of these claims in other portions of the Office Action. In particular, and as noted earlier, Figure 2 has been elected for examination in the present application, pursuant to an election of species requirement. The Examiner has examined Claims 26 and 31 on the merits, and this inherently means that the Examiner agrees that Claims 26 and 31 read onto the embodiment of Figure 2 (which has not changed since the original filing of this application). In contrast, if the subject matter of Claims 26 and 31 was not supported by the embodiment of Figure 2, the Examiner would have indicated that Claims 26 and 31 do not read onto the elected embodiment of Figure 2, and would have withdrawn Claims 26 and 31 from examination on the merits (just as Claim 29 has been withdrawn from examination). But by examining Claims 26 and 31 on the merits (rather than withdrawing them from examination), the Examiner effectively admits that they read onto and are supported by the embodiment of Figure 2. Consequently, there is no reasonable basis for the Examiner to simultaneously take a directly inconsistent position, in particular by rejecting Claims 26 and 31 under the first paragraph of §112 on the theory that they do not read onto and are not supported by any embodiment in the originally-filed papers, including the elected embodiment of Figure 2.

A separate consideration is that, in discussing the §112 rejection at lines 6-18 on page 7 of the final rejection, the Examiner essentially admits that, when the phase change material fully fills the portion of the cavity which is not taken up by the porous material, the phase change material is not capable of any substantial movement within the cavity. More specifically, in this portion of the final rejection, the

Examiner is responding to a prior argument by Applicants that, where the phase change material or PCM (7, 15, 27) fully fills the portion of the cavity that is not taken up by porous material (1, 13, 25), the PCM is not capable of any substantial movement within the cavity, as recited in Claims 26 and 31. At lines 8-12 on page 7 of the final rejection, the Examiner expressly admits that the present application (as originally filed) teaches that the PCM 7 in Figure 1 can fully fill the remainder of the cavity (such that it is free of any substantial movement within the cavity). Since the Examiner basically admits that the subject matter recited in Claims 26 and 31 is present in and supported by the originally-filed disclosure of the embodiment of Figure 1, there is no reasonable basis for maintaining a §112 first paragraph rejection of these same claims on the theory that no embodiment in the originally-filed application discloses this subject matter. In essence, the Examiner is attempting to simultaneously maintain two positions which are directly inconsistent. In this regard, the first paragraph of 35 U.S.C. §112 specifies that:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Thus, by its own terms, the first paragraph of §112 applies to the specification as a whole, and not just to a portion of the specification, such as a portion that relates to a currently elected embodiment. Consequently, in the present application, the fact that Figure 1 is a non-elected embodiment is irrelevant here, and Claims 26 and 31 cannot properly be rejected under the first paragraph of §112 for lack of support if in fact they are supported by the embodiment of Figure 1. Since the Examiner effectively concedes that the subject matter of Claims 26 and 31 is supported by the embodiment of Figure 1, it is respectfully submitted that the terms of the first paragraph of §112 are satisfied, and that the §112 rejection must be reversed.

Although the Examiner recognizes that the subject matter of Claims 26 and 31 is in fact supported by the embodiment of Figure 1, as discussed above, the Examiner asserts at lines 7-8 on page 7 of the final rejection that Applicants cannot rely on the embodiment of Figure 1 in order to overcome the §112 rejection, based on a theory to the effect that, with reference to a prior appeal in this application, the embodiment of Figure 1 was "abandoned per the Board of Appeals Decision" rendered in 1999. Applicants disagree. First, the prior Board Decision related solely to the elected embodiment of Figure 2, and made no statement about the embodiment Figure 1, much less a statement to the effect that Figure 1 has been abandoned. Figure 1 is not currently elected, but it is certainly not abandoned. Moreover, the issue under the first paragraph of §112 is whether the subject matter of Claims 26 and 31 is disclosed in the embodiment of Figure 1 as originally filed. Even assuming that the embodiment of Figure 1 could somehow have become "abandoned" at a point in time long after the original filing,

that would be irrelevant to the rejection under §112, which is specifically concerned with what the present application (including Figure 1) disclosed as of the time the application was originally filed. And in that regard the Examiner basically admits that the subject matter of Claims 26 and 31 is supported by the embodiment of Figure 1 as originally filed.

As noted above, the Examiner basically concedes that the subject matter of Claims 26 and 31 was present in the disclosure of Figure 1 of the originally-filed application. As also discussed above, support for these claims in the embodiment of Figure 1 overcomes the §112 rejection even though Figure 1 is not the elected embodiment, because support by any embodiment is sufficient for the purposes of the first paragraph of §112. Nevertheless, for purposes of completeness, Applicants will now explain why, contrary to the assertions of the Examiner, support for the subject matter of Claims 26 and 31 is in fact present in the elected embodiment of Figure 2.

In this regard, at lines 6-18 on page 7 of the final rejection, the Examiner concedes that, where a phase change material fully fills a portion of a cavity which is not taken up by phase change material, the phase change material is not capable of substantial movement within the cavity. In lines 8-12 on page 7, the Examiner also concedes that this is true for the embodiment of Figure 1, due to the fact that the specification of the present application states (at lines 7-10 on page 7) that the phase change material 7 in Figure 1 can be entered into the cavity so as to "fully fill the remainder of the cavity". On the other hand, the Examiner asserts that this not true as to the embodiment of Figure 2, in particular by stating in the final rejection (at lines 10-12 on page 7)

that the originally-filed application contains no teaching that the cavity in the embodiment of Figure 2 can be fully filled with the phase change material 15. Applicants disagree, for the following reasons.

As evident from a glance at Figures 2 and 3, they have significantly different structural configurations, and all of the reference numerals are different. In other words, they are clearly different embodiments. Nevertheless, at lines 10-18 on page 7 of the final rejection, the Examiner discusses the embodiment of Figure 2 and the embodiment of Figure 3 as if they were actually one single embodiment. For example, the Examiner talks about the phase change material of Figure 2 using reference numeral 27, when in fact reference numeral 27 identifies the phase change material in Figure 3. In essence, the Examiner asserts that the embodiment of Figure 3 has certain characteristics (which Applicants do not necessarily concede to be a correct interpretation of Figure 3). Then, the Examiner attempts to imply those asserted characteristics from the embodiment of Figure 3 into the embodiment of Figure 2, for example by mixing together the reference numerals from these two different embodiments. But Applicants respectfully submit that, since Figures 2 and 3 are clearly different embodiments, the disclosure of Figure 3 is irrelevant to the issue of whether the subject matter of Claims 26 and 31 is present in the embodiment of Figure 2.

Therefore, setting aside the embodiment of Figure 3 and focusing on the embodiment of Figure 2, Applicants respectfully direct the attention of the Board to the sentence which bridges pages 7-8 of the specification, where the present application states that the phase change material 15 of Figure 2 is "entered into the cavity as in the first embodiment". As noted above, the present application teaches

in the first paragraph on page 7 that the phase change material 7 for the first embodiment (Figure 1) can be entered into the cavity so as "fully fill the remainder of the cavity". Applicants thus respectfully submit that the present application clearly and unequivocally teaches that the phase change material 15 for the embodiment of Figure 2 can "fully fill" the remainder of the cavity in Figure 2. As discussed above, the Examiner does not dispute that a phase change material which "fully fills" the cavity is incapable of substantial movement within the cavity. Accordingly, it is respectfully submitted that the embodiment of Figure 2 discloses and supports the recitation in Claims 26 and 31 that a phase change material is free of substantial movement within the cavity. Consequently, it is respectfully submitted that the subject matter of Claims 26 and 31 is supported not only by the originally-filed embodiment of Figure 1 (as admitted by the Examiner), but is also supported by the originally-filed embodiment of Figure 2.

Summarizing, for each of several separate reasons that have been separately discussed above, it is respectfully submitted that the subject matter of Claims 26 and 31 is disclosed in and supported by the originally-filed application, including not only the embodiment of Figure 1 (as admitted by the Examiner), but also the embodiment of Figure 2. It is therefore respectfully requested that the Board reverse the rejection of Claims 26 and 31 under the first paragraph of §112.

B. TELKES U.S. PATENT NO. 2,677,367

In the final rejection mailed June 3, 2002, all of the art rejections under 35 U.S.C. §102 and §103 rely on Telkes U.S. Patent No. 2,677,367, considered by itself or in

combination with other references. Accordingly, for purposes of convenience and clarity, a brief discussion of pertinent portions of Telkes is offered here, in advance of the discussion of each of the separate art rejections.

As evident from the sentence at lines 1-5 of Column 1, the Telkes patent is directed to a heat storage unit which can accept and store heat, and which can later give up the heat. In the present application, the art rejections based on Telkes all rely specifically on the embodiment shown in Figure 4 of Telkes. As explained in the paragraph at lines 43-51 of Column 4 of Telkes, the embodiment of Figure 4 includes a container 10 having therein a cavity, a matrix 14' of glass wool provided in the cavity, and a solution of water and disodium orthophosphate (Na_2HPO_4) provided in a portion of the cavity that is not taken up by the glass wool matrix 14'.

As discussed in the text running from line 22 of Column 1 through line 25 of Column 2, disodium orthophosphate has a high latent heat of fusion, or in other words absorbs a substantial amount of heat as it changes from a solid to a liquid. The heat storage unit 12 stores heat by taking advantage of the fact that disodium orthophosphate absorbs a substantial amount of heat as it changes from a solid to a liquid. When this chemical subsequently gives up the heat and changes from a liquid back into a solid, it can crystallize into either of two different hydrates, for example as discussed in the sentence at lines 42-47 in Column 1. Telkes teaches in the indicated text of Columns 1 and 2 that, for proper operation, it is desirable for the disodium orthophosphate to crystallize into one specific type of hydrate, and do to so predictably. Accordingly, as discussed in the paragraphs at lines 11-25 of Column 2, lines 52-59 of Column 3, and lines 43-51 of Column 4, Telkes provides the

glass wool 14' within the cavity in Figure 4, in order to serve as a "crystalline promoter" which reliably ensures that the desired hydrate will crystallize, and that the undesired hydrate will not crystallize. It should be noted that the glass wool 14' is provided specifically for the purpose of promoting a particular type of crystallization within the phase change material, and is not provided for the purpose of serving as a heat conductor.

As evident from the sentence at lines 43-46 of column 4, the glass wool 14' in Figure 4 has an overall size which effectively corresponds to the size of the cavity in the container 10, such that the glass wool "extends substantially throughout the interior of the container 10, so that it will not settle to the bottom". It should be noted that Telkes does not teach that the glass wool 14' is coupled physically or thermally to the container 10. If the glass wool was physically coupled to the container, it would not be able to settle to the bottom of the cavity, even if it did not extend throughout the cavity. In emphasizing that the glass wool does not settle to the bottom because it extends substantially throughout the cavity, Telkes is implicitly stating that the glass wool is not directly physically coupled to the container. Instead, the glass wool 14' is loose within the cavity, and is probably capable of at least a small and limited amount of movement within the container 10. Various points on the glass wool may thus move into and out of contact with the container 10, for example due to expansion and contraction of the container and/or the glass wool caused by temperature changes, or due to small forces which the phase change material may exert on the container 10 and glass wool 14' as the phase change material transitions between liquid and solid phases.

C. GROUP 2 - CLAIMS 25-27 AND 30-31 - §102 REJECTION

Independent Claims 25 and 30, as well as dependent Claims 26-27 and 31, all stand rejected under 35 U.S.C. §102 as anticipated by Telkes U.S. Patent No. 2,677,367. This ground of rejection is respectfully traversed as to all of these claims. The following discussion will focus on independent Claims 25 and 30. Dependent Claims 26-27 and 31 will stand or fall with Claims 25 and 30 for purposes of this rejection and this appeal.

As discussed above, independent Claim 25 is an apparatus claim which recites a heat sink that has an enclosure with a cavity therein, the enclosure having a highly thermally conductive portion. A highly thermally conductive porous material is disposed within the cavity, and a phase change material is provided within the cavity so as to be disposed within voids in the porous material. Claim 25 includes a recitation that the porous material is coupled "physically and thermally to said highly thermally conductive portion of said enclosure".

Independent Claim 30 is a method claim rather than an apparatus claim, but includes limitations analogous to those discussed in the preceding paragraph with respect to apparatus Claim 25. In this regard, Claim 30 includes a recitation that a porous material in a cavity of an enclosure "is coupled physically and thermally to said highly thermally conductive portion of said enclosure".

The §102 rejection is based on the Telkes patent, the disclosure of which has already been discussed in detail at an earlier point in this Brief. As evident from lines 3-7 on page 6 of the final rejection, the §102 rejection is based on the embodiment shown in Figure 4 of Telkes. As discussed

earlier, Figure 4 discloses a container 10 having a cavity therein. A glass wool material 14' is provided within the cavity, and has voids which are filled by a phase change material. At lines 43-46 in Column 4, Telkes teaches that the glass wool 14' has a physical size which is similar to the physical size of the cavity in the container, as a result of which the glass wool "extends substantially throughout the interior of the container 10, so that it will not settle to the bottom". At lines 6-7 on page 6 of the final rejection, the Examiner asserts that, in view of the statement in Telkes that the glass wool "will not settle to the bottom", the glass wool must be physically coupled to the wall of the container. However, the Examiner's assertion is directly contrary to what Telkes actually does teach.

More specifically, Telkes teaches that the glass wool does not settle to the bottom of the container because it has an overall size which corresponds to the size of the cavity, even though it merely fits within the cavity without being physically coupled to the container. If the glass wool was physically coupled to the container, it would not be able to settle to the bottom of the cavity, even if it did not extend throughout the cavity. In emphasizing that the glass wool does not settle to the bottom because it extends substantially throughout the cavity, Telkes is implicitly stating that the glass wool is not directly coupled to the container. Thus, the embodiment in Figure 4 of Telkes lacks at least one element of the combination recited in each of independent Claims 25 and 30, since the portions of Claims 25 and 30 quoted above each specify that a porous material in a cavity of an enclosure is coupled physically and thermally to the enclosure, whereas the glass wool 14' in the cavity of Telkes is not coupled to the container 10.

With respect to anticipation under §102, the Court of Appeals for the Federal Circuit has consistently adhered to the basic principle that: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed.Cir. 1987). Similarly, "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed.Cir. 1989). While Applicants do not rely on the Manual of Patent Examining Procedure (MPEP) as authority here, it is noted that the *Verdegaal* and *Richardson* decisions of the Federal Circuit are each cited in MPEP §2131 as authority for the same principle for which they are cited here.

In the present application, and with reference to *Verdegaal* and *Richardson*, Telkes fails to satisfy the requirement that "each and every element as set forth in the claims is found" in Telkes, and Telkes fails to meet the requirement that "the identical invention must be shown in as complete as detail as is contained in the . . . claim". Consequently, since the embodiment of Figure 4 of Telkes clearly lacks a significant element recited in each of independent Claims 25 and 30, it is impossible for Figure 4 of Telkes to anticipate either of Claims 25 and 30 under §102. Since Claims 26-27 and 31 each depend from Claim 25 or Claim 30, and thus inherently include the same limitation, it is respectfully submitted that Claims 26-27 and 31 cannot possibly be anticipated by Telkes. Applicants therefore respectfully request that the Board reverse the Examiner's rejection of Claims 25-27 and 30-31 for anticipation under §102 based on Telkes.

D. GROUP 3 - CLAIMS 1-2, 7-8, 17-20 AND 28 - §103 REJECTION

This ground of rejection begins in the final rejection at lines 25-26 on page 4, where the final rejection asserts that Claims 1-2, 7-8, 17-22 and 28 would all be obvious under 35 U.S.C. §103 in view of a combination of teachings from Telkes U.S. Patent 2,677,367 and Voorhes U.S. Patent No. 5,390,734. However, the reference there to Claims 21-22 is a typographical error, because it is inconsistent with the treatment of Claims 21-22 in a different portion of the final rejection. In particular, at lines 12-15 on page 5 of the final rejection, the Examiner indicates that the subject matter recited in Claims 21 and 22 is not obvious from the combined teachings of Telkes and Voorhes, and that an additional reference (Hayes or Alspaugh) must be considered in combination with Telkes and Voorhes as to Claims 21 and 22. Moreover, the explanation of this ground of rejection in the first paragraph on page 5 of the final rejection does not include any mention of the subject matter of Claims 21 and 22. Accordingly, to avoid confusion, Claims 21-22 are omitted from this section of the argument in this Brief, and will instead be addressed in the next section.

Turning to the remaining claims which are subject to this ground of rejection, Claims 1-2, 7-8 and 17-20 and 28 all stand rejected under 35 U.S.C. §103 as obvious in view of a combination of teachings from Telkes and Voorhes. This ground of rejection is respectfully traversed, for several reasons discussed below. In this regard, the following discussion will focus on Claims 1 and 28. Claims 2, 7-8 and 17-20 each depend from independent Claim 1, and will stand or fall with Claim 1 for purposes of this rejection and this appeal.

Independent Claim 1 is directed to an apparatus which includes a heat sink having an enclosure with a cavity, the enclosure having a portion which is highly thermally conductive. The cavity contains a porous and highly thermally conductive material, and a phase change material is provided in a portion of the cavity that is not taken up by the porous material. Claim 1 recites that the highly thermally conductive portion of the enclosure is "composed of a composite of highly thermally conductive fibers disposed in a matrix", and also recites that the porous material in the cavity is defined by "a plurality of said fibers extending externally of said matrix and into said cavity to provide a porous, highly thermally conductive material integral with and thermally coupled to said highly thermally conductive portion" of the enclosure.

Claim 28 is a dependent claim, which depends from independent Claim 25. As discussed above, independent Claim 25 is directed generally to a heat sink having an enclosure with a highly thermally conductive portion and a cavity, the cavity containing a porous material and a phase change material. Dependent Claim 28 recites that the highly thermally conductive "portion of said enclosure includes a composite of highly thermally conductive fibers which are disposed in a matrix and which have portions extending from said matrix into said cavity, said porous material including portions of said fibers".

With reference to the final rejection, the last sentence on page 4 admits that the Telkes patent does not disclose an enclosure or container with a portion which is "a composite of highly thermally conductive fibers disposed in a matrix". Thus, the final rejection concedes that Telkes fails to teach distinctive features which are recited in the above-

quoted limitations from each of Claims 1 and 28. However, with reference to the paragraph at the top of page 5 of the final rejection, the Examiner asserts that these features are disclosed in Figure 11d of the Voorhes patent, and that it would have been obvious in view of Figure 11d of Voorhes to modify Telkes to include such features. Applicants respectfully disagree, for several reasons which are discussed below.

First, Figures 11a through 11e of Voorhes are related figures which show various successive steps in a process for making a final device depicted in Figure 11e. The device shown in Figure 11d of Voorhes is thus not a final product, but instead represents merely an intermediate step in the overall process of making the final device shown in Figure 11e. The device in Figure 11d has a plurality of spaced graphite fibers 74, which are provided for purposes of thermal conductivity, and which each have an upper end embedded in a block 75 that is made of an adhesive material. But in the final device of Figure 11e, the fibers 74 have been drawn together as tightly as possible, so as to form a tightly packed bundle 77 which is clearly not a porous medium with voids that can contain a phase change material. The Examiner apparently agrees that the device in Figure 11e of Voorhes does not disclose the distinctive features recited in the above-quoted language from Claims 1 and 28, because the Examiner has consistently maintained a rejection based on the intermediate device of Figure 11d, rather than the final device of Figure 11e.

Voorhes does not teach or even suggest that the intermediate device of Figure 11d is capable of any beneficial use by itself. To the contrary, Voorhes teaches that, in order to reach the useful configuration shown in Figure 11e,

further changes must be made to the device of Figure 11d. Consequently, it is respectfully submitted that a person of ordinary skill in the art would have absolutely no motivation to take the device shown in Figure 11d of Voorhes and to view it as a final operational configuration which could be successfully incorporated into any other type of device. In fact, Voorhes effectively teaches away from this.

In this regard, it is well-established that, when evaluating obviousness under §103, a prior art reference must be considered as a whole, including portions that would lead away from the present invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed.Cir. 1983), cert. denied, 469 U.S. 851 (1984). While Applicants do not rely on the Manual of Patent Examining Procedure (MPEP) as authority here, it is noted that the Gore decision of the Federal Circuit is cited in MPEP §2141.02 as authority for the same principle for which it is cited here. Consequently, in the present application, Figure 11d of Voorhes cannot be considered in isolation without regard to other teachings in Voorhes. Thus, to the extent Voorhes teaches that the device of Figure 11d is incomplete and must be subjected to further processing, it would not be an obvious expedient to take the incomplete and partially fabricated device of Figure 11d and incorporate it into the apparatus shown in Figure 4 of Telkes.

There is a separate and independent reason why a person of ordinary skill in the art would have no motivation to attempt to make the proposed modification to Telkes in view of Voorhes. More specifically, and as discussed earlier, Telkes does not provide the porous glass wool material 14' in the cavity of his container for the purpose of conducting heat. Instead, the glass wool is there to serve as a "crystallization promoter" which ensures that, when the phase

change material changes from a liquid to a solid through crystallization, the crystals that materialize are a specific and desired type of hydrate, rather than a different and undesired type of hydrate. Consequently, the porous material in Telkes has nothing at all to do with thermal conductivity.

In contrast, Voorhes deals specifically with thermal conductivity, but has no teachings on techniques for controlling crystallization, and certainly does not teach or suggest that the device of Figure 11d (or any other disclosed device) would be of any benefit in achieving control over any type of crystallization process, much less the specific crystallization process involved in the Telkes device. It would therefore not be an obvious expedient to replace the porous material of Telkes (which must be capable of controlling a specific crystallization process) with the fiber configuration shown in Figure 11d of Voorhes (which is specifically selected for its thermal conductivity rather than for any characteristic relating to control of crystallization). Stated differently, the Examiner is attempting to combine completely unrelated technologies, and there is nothing in either Telkes or Voorhes which would motivate a person of ordinary skill in the art to attempt to combine unrelated technologies in this manner. Instead, the motivation for the proposed combination appears to be based directly on hindsight of the present invention, and in particular represents an attempt to reconstruct Applicants' claimed configuration with isolated parts drawn from unrelated technologies, using Applicants' own disclosure as a blueprint for the reconstruction. It is well-established that, when evaluating obviousness under §103, it is not permissible to engage in this type of hindsight reconstruction of a claimed invention, using the Applicants' disclosure as a template and

selecting elements from references to fill the gaps. *In re Gorman*, 933 F.2d 982, 986-7, 18 USPQ2d 1885, 1888 (Fed.Cir. 1991).

As a further consideration, it is also respectfully submitted that, if the teachings of Telkes and Voorhes were combined in the proposed manner, the resulting device would probably not be operative. In this regard, the porous glass wool material in the container of Telkes was carefully selected to promote a particular type of crystallization, and there is absolutely no reason to assume from the teachings of either Telkes or Voorhes that the fiber structure in Figure 11d of Voorhes, which is configured for thermal conductivity, would necessarily promote the particular type of crystallization which is critically essential to proper operation of the Telkes device. Most likely, the modified Telkes device will exhibit highly degraded operation in comparison to the original Telkes device, and there is a very high likelihood that the modified Telkes device would be completely inoperative. And if the modified Telkes device did not promote crystallization in a manner at least as effective as the original Telkes device, then the principle of operation of the Telkes device would have changed, which in turn means that the proposed modification would not be an obvious modification under §103. In this regard, it is well-established that if a proposed modification to a prior art device would change the principle of operation of the device, then the proposed modification is not obvious under §103. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Similarly, if a proposed modification would render a device unsatisfactory for its intended purpose, then the proposed modification is not obvious under §103. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed.Cir. 1984). And while Applicants

do not rely on the Manual of Patent Examining Procedure (MPEP) as authority here, it is noted that the *Ratti* and *Gordon* decisions are each cited in MPEP §2143.02 as authority for the same principles for which they are cited here. It is respectfully submitted that the proposed modification to the Telkes device, involving the substitution of a thermally conductive material for a crystalline promoter material, would apparently change the principle of operation of the Telkes device, and/or render it unsatisfactory for its intended purpose. Consequently, this proposed modification would not be obvious.

Summarizing, for each of several separate reasons that have been separately discussed above, it is respectfully submitted that the subject matter of Claims 1 and 28 would not be obvious in view of Telkes and Voorhes. Since Claims 2, 7-8 and 17-20 each depend from Claim 1, and thus inherently include the limitations of Claim 1, it is respectfully submitted that Claims 2, 7-8 and 17-20 are also not obvious in view of Telkes and Voorhes. Applicants therefore respectfully request that the Board reverse the Examiner's rejection of Claims 1-2, 7-8, 17-20 and 28 under §103 for obviousness in view of Telkes and Voorhes.

E. GROUP 4 - CLAIMS 21-22 - §103 REJECTION

Dependent Claims 21 and 22 stand rejected under 35 U.S.C. §103 as obvious in view of a combination of teachings from Telkes U.S. Patent No. 2,677,367, Voorhes U.S. Patent No. 5,390,734 and either Hayes U.S. Patent No. 4,446,916 or Alspaugh U.S. Patent No. 4,341,262. This ground of rejection is respectfully traversed, for the following reasons.

Claim 21 depends directly from independent Claim 1, and Claim 22 depends indirectly from independent Claim 1. As

discussed earlier, independent Claim 1 is directed to an apparatus which includes a heat sink having an enclosure with a cavity, the enclosure having a portion which is highly thermally conductive. The cavity contains a porous and highly thermally conductive material, and a phase change material is provided in a portion of the cavity that is not taken up by the porous material. Dependent Claims 21 and 22 each recite that the phase change material is a wax.

With reference to the paragraph which bridges pages 5-6 of the final rejection, the Examiner indicates that Hayes and Alspaugh each teach a heat storage device having a phase change material which is a wax. Applicants agree. However, Claim 21 and 22 each depend from and inherently include the limitations of Claim 1. Thus, Claims 21 and 22 each include the limitation from Claim 1 which specifies that a recited enclosure includes "a highly thermally conductive portion composed of a composite of highly thermally conductive fibers disposed in a matrix", with "a plurality of said fibers extending externally of said matrix and into said cavity to provide a porous, highly thermally conductive material".

As to these features, which Claims 21 and 22 derive from Claim 1, the Examiner relies on Telkes in view of Voorhes, based on precisely the same line of reasoning discussed above in association with the rejection of Claim 1. Applicants respectfully submit that, since Claims 21 and 22 inherently include all of the limitations of Claim 1, they are distinct from the combined teachings of Telkes and Voorhes for the same reasons as Claim 1. Stated differently, Claims 21 and 22 each depend from Claim 1, and if Claim 1 is allowable for the reasons discussed in the preceding section of this Brief, Claims 21 and 22 are also necessarily allowable with Claim 1.

Accordingly, it is respectfully submitted that the subject matter of Claims 21 and 22 would not be obvious in view of Telkes and Voorhes, even if considered in view of Hayes or Alspaugh. Applicants therefore respectfully request that the Board reverse the Examiner's rejection of Claims 21 and 22 under §103 for obviousness in view of Telkes, Voorhes, and either of Hayes or Alspaugh.

CONCLUSION

For the reasons given in the foregoing discussion, it is respectfully submitted that the rejection of each of Claims 1-2, 7-8, 17-22, 25-28 and 30-31 is erroneous, and reversal of the rejection of each of these claims is respectfully requested.

Respectfully submitted,
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Enclosure: Appendix A - Claims on Appeal

APPENDIX A - CLAIMS ON APPEAL

(Note - Claim 29 is pending in the application, but is omitted here because it has been withdrawn from examination and is not one of the claims which are on appeal).

1. An apparatus comprising a heat sink which in its entirety can absorb heat over time, said heat sink including:

(a) an enclosure defining an enclosed cavity and having a highly thermally conductive portion composed of a composite of highly thermally conductive fibers disposed in a matrix;

(b) a plurality of said fibers extending externally of said matrix and into said cavity to provide a porous, highly thermally conductive material integral with and thermally coupled to said highly thermally conductive portion and disposed in said cavity, said porous material being said plurality of said thermally conductive fibers extending from said matrix into said cavity, and

(c) a phase change material disposed in said porous material in said cavity, said phase change material being operable in its entirety to absorb heat over time, and said phase change material changing from an initial phase to a final phase in response to the absorption of heat.

21. The apparatus of claim 1 wherein said phase change material is a wax.

17. The apparatus of claim 1 wherein said thermally conductive fibers are graphite.

7. The apparatus of claim 1 wherein said porous material is substantially homogeneously disposed within said cavity.

19. The apparatus of claim 7 wherein said thermally conductive fibers are graphite.

2. The apparatus of claim 1 wherein said initial phase of said phase change material is a solid phase and said final phase is a liquid phase.

22. The apparatus of claim 2 wherein said phase change material is a wax.

18. The apparatus of claim 2 wherein said thermally conductive fibers are graphite.

8. The apparatus of claim 2 wherein said porous material is substantially homogeneously disposed within said cavity.

20. The apparatus of claim 8 wherein said thermally conductive fibers are graphite.

25. An apparatus comprising a heat sink which in its entirety is operable to effect over a period of time a net absorption of heat from externally thereof, said heat sink including:

an enclosure having a cavity therein, said enclosure having a highly thermally conductive portion;

a highly thermally conductive porous material disposed within said cavity and coupled physically and thermally to

said highly thermally conductive portion of said enclosure, said porous material having voids therein; and

a phase change material provided within said cavity so as to be disposed within and substantially fill said voids in said porous material, said phase change material being operable in its entirety over a period of time to effect a net absorption of heat introduced thereinto through said highly conductive portion and said porous material, said phase change material changing in its entirety from a solid phase to a liquid phase in response to said absorption of heat by said phase change material.

26. The apparatus of claim 25, wherein said phase change material is free of substantial movement within said cavity.

27. The apparatus of claim 25, wherein said porous material includes a plurality of highly thermally conductive fibers.

28. The apparatus of claim 25, wherein said portion of said enclosure includes a composite of highly thermally conductive fibers which are disposed in a matrix and which have portions extending from said matrix into said cavity, said porous material including said portions of said fibers.

30. A method of operating a heat sink so that, over a period of time, said heat sink will in its entirety experience a net absorption of heat from externally thereof, said heat sink including an enclosure with a highly thermally conductive portion, a highly thermally conductive porous material which has voids therein, which is disposed within a cavity in said enclosure and which is coupled physically and thermally to

said highly thermally conductive portion of said enclosure, and a phase change material which is provided within said cavity so as to be disposed within and substantially fill said voids in said porous material, said method including the steps of:

applying heat to said highly thermally conductive portion of said enclosure from externally of said enclosure;

transmitting heat through said highly thermally conductive portion of said enclosure and through said porous material to said phase change material;

causing said phase change material in its entirety to effect, over a period of time, a net absorption of heat introduced thereinto through said highly thermally conductive portion of said enclosure and said porous material ; and

causing said phase change material to change in its entirety from a solid phase to a liquid phase in response to said absorption of heat by said phase change material.

31. The method of claim 30, including the step of causing said phase change material to be substantially free of movement within said cavity.